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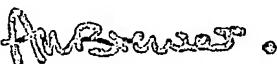
PCT

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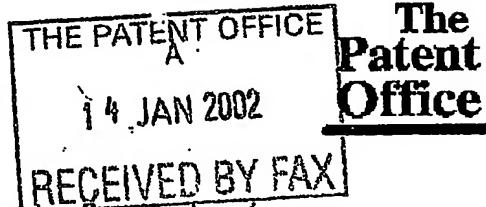
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Dated 10 February 2003

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## Patents Form 1/77

Patents Act 1977  
(Rule 16)

1/77

## Request for grant of a patent

The Patent Office

Cardiff Road  
Newport  
South Wales NP10 8QQ

14 JAN 2002 E607499.1 D02011

P01/7700 0.00-0200656.7

1. Your reference

A10494GB - WL

2. Patent application number  
(*The Patent Office will fill in this part*)

0200656.7

14 JAN 2002

3. Full name, address and post code of the or of  
each applicant (*underline all surnames*)Burley Appliances Limited  
Lands End Way  
Oakham  
Rutland  
LE15 6QFPatents ADP number (*if you know it*)

589979402

If the applicant is a corporate body, give the  
country/state of its incorporation

UNITED KINGDOM

4. Title of the invention

Apparatus for Simulating Flames

5. Name of your agent (*if you have one*)

Forrester Ketley &amp; Co.

"Address for service" in the United Kingdom  
to which all correspondence should be sent  
(*including the postcode*)Chamberlain House  
Paradise Place  
Birmingham, B3 3HP.Patents ADP number (*if you know it*)

133005

6. If you are declaring priority from one or more  
earlier patent applications, give the country  
and the date of filing of the or each of these  
earlier applications and (*if you know it*) the or  
each application number

Country

Priority application number  
(*if you know it*)Date of filing  
(*day/month/year*)7. If this application is divided or otherwise  
derived from an earlier UK application,  
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the earlier application

Number of earlier application

Date of filing  
(*day/month/year*)8. Is a statement of inventorship and of right  
to grant of a patent required in support of  
this request? (*Answer "Yes" if:*  
a) *any applicant named in part 3 is not an inventor, or*  
b) *there is an inventor who is not named as an*  
*applicant, or*  
c) *any named applicant is a corporate body.*  
*See note (d)*

YES

Patents Form 1/77

## Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form.  
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Description	6
Claim(s)	-
Abstract	-
Drawing(s)	2 <i>only</i>

10. If you are also filing any of the following, state how many against each item.

Priority documents	NONE
Translation of priority documents	-
Statement of inventorship and right to grant of a patent (Patents Form 7/77)	-
Request for preliminary examination and search (Patents Form 9/77)	-
Request for substantive examination (Patents Form 10/77)	-
Any other documents (please specify)	-

11. I/We request the grant of a patent based on the basis of this application

Signature

*Forrester Ketley & Co.*

Date

14 January, 2002

Forrester Ketley &amp; Co.

12. Name and daytime telephone number of person to contact in the United Kingdom William Lally 0121 236 0484

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## PATENTS ACT 1977

A10494GB - WL

Title: Apparatus For Simulating Flames

Description of Invention

This invention relates to apparatus for simulating flames, and particularly but not exclusively to apparatus for simulating flames in a solid fuel effect fire, to give the impression of flames emanating from combusting fuel.

A conventional apparatus for simulating flames, herein referred to as being of the kind specified, comprises a housing, a flame effect means in the housing, a source of light to illuminate the flame effect means in the housing, and a screen through which light is transmitted from the housing. Frequently a means is provided, such as by a fan, to cause the flame effect means to move in the housing, and frequently the screen is translucent, to make the visual effect produced within the housing somewhat diffuse.

Several arrangements have been used in the past to simulate flames in apparatus of the kind specified: for example, in GB-A-968568, there is shown an apparatus in which the flame effect means comprises a plurality of reflective ribbons suspended adjacent to a rear part of the fire, the light source being located forwardly of the ribbons, with a translucent screen also being located forwardly of the ribbons, such that light from the light source reflected from the ribbons is incident on a rear face of the screen, giving a flame effect when the screen is viewed from the front.

As another example, it is known from GB-A-1186655 to suspend the ribbons in front of the light source, so that light is transmitted between the strips directly onto the translucent screen.

In the specification of our European patent specification EP 0986722 - A, the flame effect means is in the form of a sheet of translucent material, such as crepe-de-chine, which is provided with a plurality of vertically-extending

elongate slits, the material being located optically between the light source and the screen. A fan within the housing causes the material to billow, and the slits periodically to open a short distance, allowing light to be transmitted directly onto the screen, thus simulating a flame.

It has been appreciated by the present inventor, that in the past the primary attention has been directed towards producing relatively high levels of light falling on the screen, and that this has not been particularly conducive to producing a high quality simulated flame.

Conversely, and in accordance with this invention, there is provided an apparatus for simulating flames, characterised by the feature that light is directed from the light source through the flame effect means onto a reflector, and reflected light passes again through the flame effect means onto the screen.

Preferably the flame effect means provides openings, means being provided to cause the flame effect means to move in the housing thereby causing the openings to move.

Preferably the flame effect means comprises a sheet of flexible material, and is preferably generally matt, producing only a low level of reflected light. For example, the flame effect means may be provided by a sheet of silky material, such as crepe-de-chine, preferably being of a dark colour, such as dark red, or even black.

Preferably the openings which are provided in the sheet are elongate, and the material is suspended loosely within the housing, being caused to "billow" by the flow of air directed there across. Such billowing will cause the slits to open, and for these openings to be seen to travel vertically in the upwards direction, or if desired, downwardly.

Light passing through the screen will be provided at four levels, as follows:

- a) light which passes from the source through the material of the flame effect means to the reflector and from the reflector back through the material of the flame effect means onto the screen;
- b) light which passed through an opening in the material of the flame effect means and through the material onto the screen either to or from the reflector;
- c) light reflected from the flame effect means directly onto the screen;
- d) light passing from the source through one of the openings onto the reflector, and from the reflector back through one or other of the openings onto the screen.

Conveniently, levels a) and b) may be maintained at a low, ineffective level, whilst the level c) is sufficient only to provide a low level background glow.

Light at level d) will be intermittent, but at a relatively high level, providing a "smoky" flame effect which may achieve a high level of realism.

By varying the thickness and colour of the material which provides the flame effect means, and by varying the thickness of the slits, the colour and power of the lamp, and the degree of fogging on the screen, a high quality flame effect means may be produced over a wide range of visual outputs.

There will now be given a detailed description, to be read with reference to the accompanying drawings, of an apparatus for simulating flames which is a preferred embodiment of this invention, having been selected for the purposes of illustrating the invention by way of example.

In the accompanying drawings:

FIGURE 1 is a vertical sectional view of an electric fire which is the preferred embodiment of this invention;

FIGURE 2 is a schematic perspective view, illustrating principles of performance of the fire; and

FIGURE 3 is an enlarged view illustrating the production of "openings" in the flame effect means.

The fire which is the preferred embodiment of this invention is an electric space heater, comprising a housing 4 having a base 6 and a rear wall 8. Located forwardly of the front wall 10 an illuminated coal effect 12 may be provided, in conventional manner.

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Suspended within the housing 4 from an upper support 13 is a sheet 14 of a lightweight flexible material, such as crepe-de-chine, said sheet being secured loosely by lower securing means 16, adjacent a lower end of the housing.

Mounted adjacent to the lower securing means 16 is a fan 18 arranged to direct a flow of air upwardly against the material 14, to cause the material to billow in an upward direction, and if desired, the lower end of the sheet may be secured to a rear wall of the fan housing.

As is seen from Figure 2, provided in the sheet 14 are a plurality of slits 20, said slits extending a majority of the height of the sheet 14, and being generally parallel to the side edges of the sheet, there being in the preferred embodiment perhaps sixteen such slits disposed uniformly width-wise of the housing 4.

Extending upwardly to an upper closure member 21 is a translucent screen 24, conveniently of perspex or glass.

Provided within the housing 10 adjacent a front face of the sheet 14 is a light source 28, arranged to direct light against the front face of the sheet 14, conveniently the light source simultaneously providing an illumination for a solid fuel (wood or coal) effect element 12.

Under the influence of the current of air directly upwardly across the sheet 14, the slits form openings 21 (see Figure 3), which move generally in the upwards direction as the sheet billows under the influence of the flow of air. However, alternatively the air flow may be directed downwardly, to cause the

openings 21 to move in the downward direction. Light directed against the sheet 14 in part passes through the material itself, falling against a generally triangular reflector 32 mounted on the rear wall 8 of the housing, light reflected therefrom passing forwardly through the sheet 14 and through the screen 24.

Some of the light transmitted against the sheet 14 will also pass through the openings themselves in one direction of traverse of the sheet 14, whilst some light will pass through openings formed by the slits 20 in both directions of traverse of the light. This latter light appears through the screen 24, and hence to a viewer of the space heater as areas 30 of light moving upwardly of the screen, quickly dissipating due to the lower degree of incidence of light from the source 28 on the upper parts of the reflector 32, and by virtue of the shape of the reflector itself, simulating flickering flames.

The level of the background glow which will be observed on the screen 24 will primarily be produced by light being reflected from the front face of the material 14 through the screen. The intensity of the background glow will be determined in part of course by the colour of the material of the sheet 14, and may, if desired, be enhanced by a reduction in thickness, so that there is a small contribution to the background glow, by light being reflected from the reflector 32, and passing through the material 14 itself.

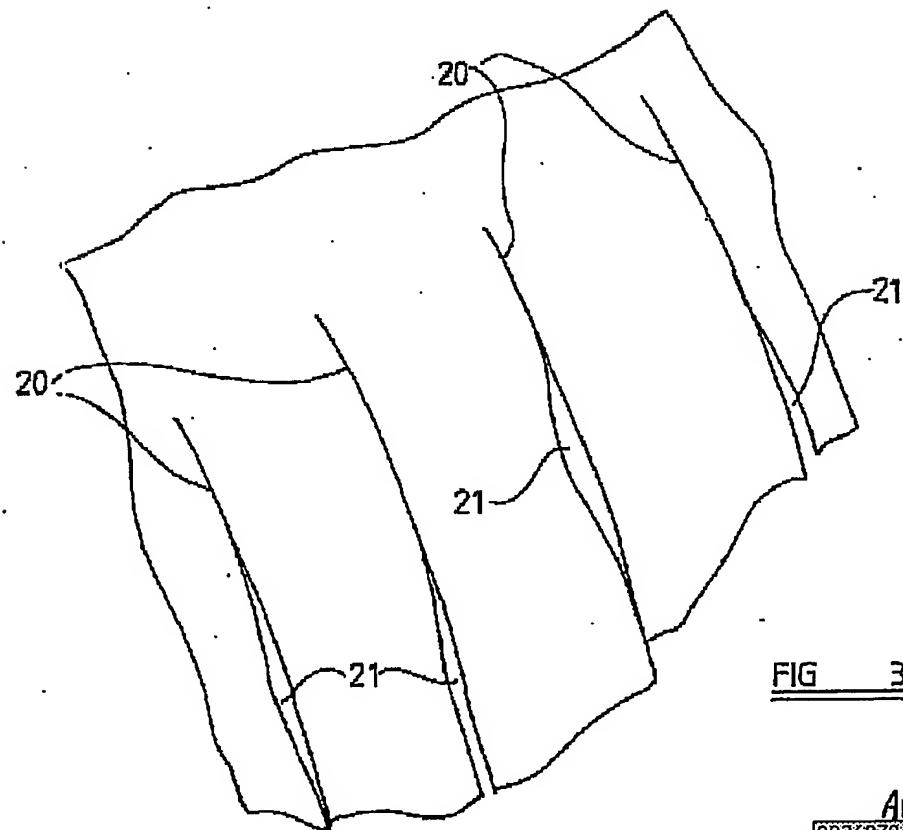
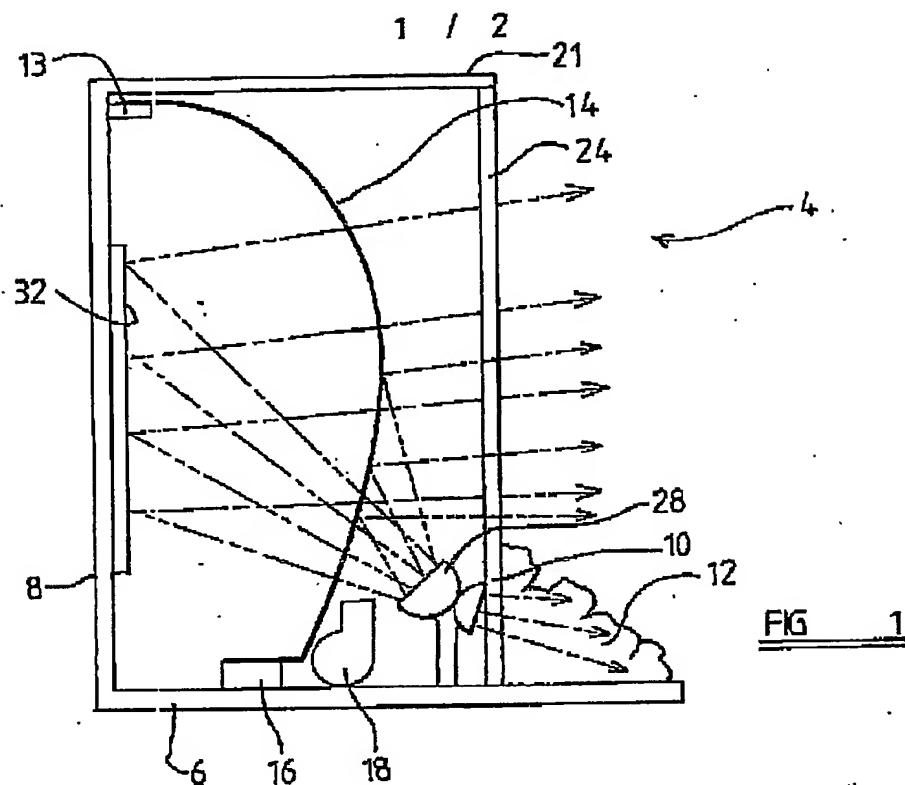
It has been found that, where the material 14 is afforded by crepe-de-chine which is black in colour, and the light source 14 is arranged to transmit a white light, a "smoky" flame effect is produced. Alternatively, a warmer effect may be produced, by the use of crepe-de-chine of a dark red colour, together with an orange light as the light source 14.

In the present specification "comprises" means "includes or consists of" and "comprising" means "including or consisting of".

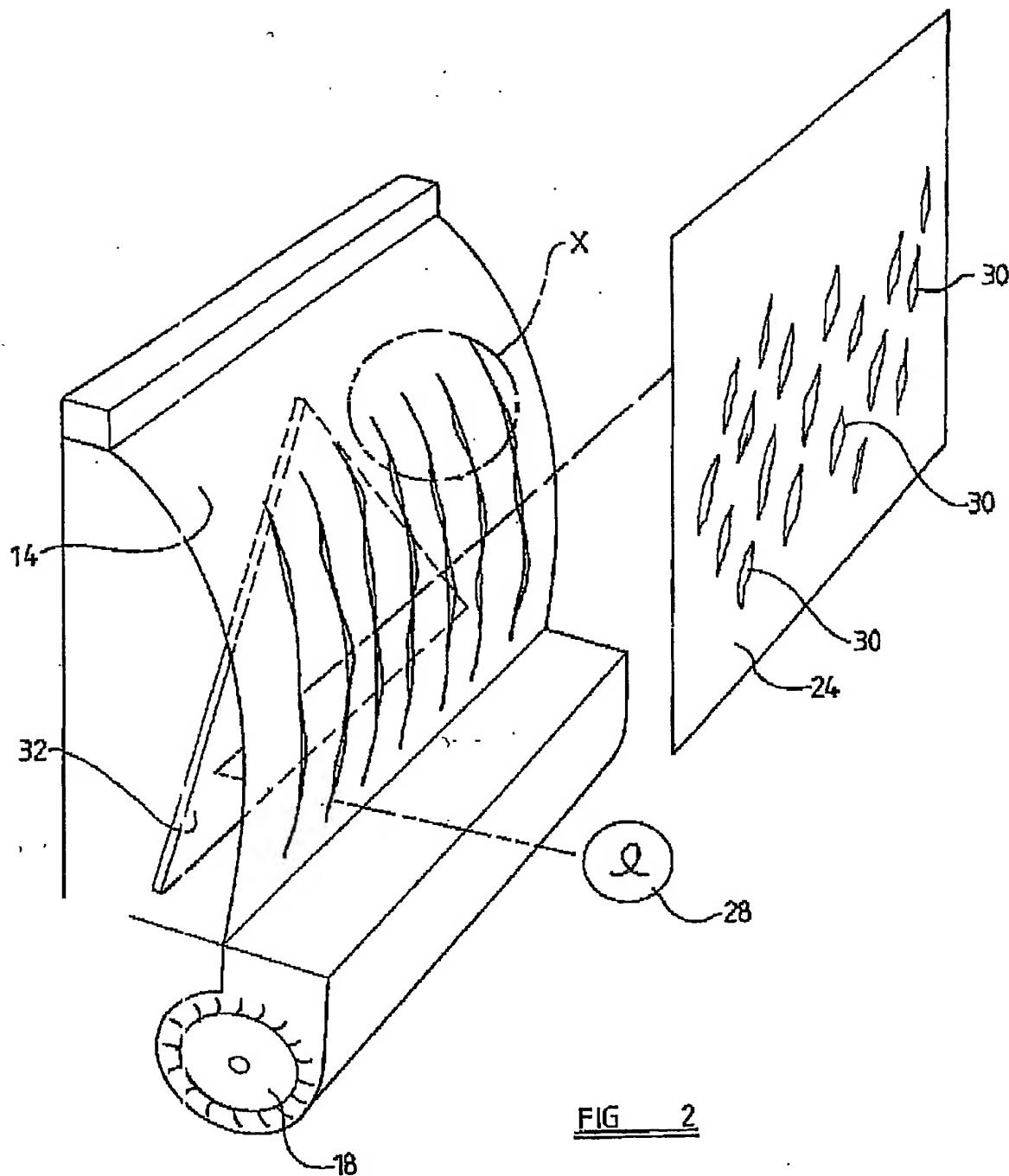
The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process

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for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof:



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FIG 2

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